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NF96-249 Nitrogen Application Practices in Nebraska

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Nitrogen Application Practices in Nebraska

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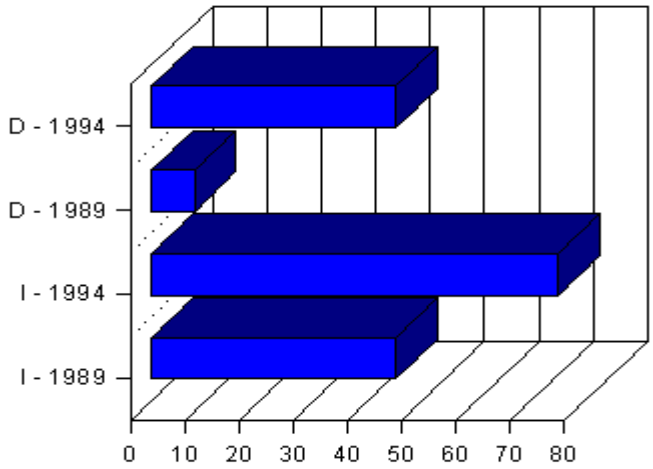
Farmers use a variety of practices to reduce the amount of nitrogen lost as run off or leached into the groundwater. These practices include providing credit for residual nitrogen in the soil by deep soil sampling, adjusting the time of application of nitrogen, and using nitrogen inhibitors. These practices, along with other practices and factors, such as the price of nitrogen, influence the amount of nitrogen farmers apply to their crops, the resulting crop yield, and the environmental consequences.

In a recent representative survey Nebraska farmers were asked about the practices they used in the 1994 crop year. These results were compared to another representative survey by Nebraska Cooperative Extension that collected similar information in 1989.

Deep soil sampling by Nebraska farmers has increased dramatically since the 1989 survey (*Figure 1*). In 1989 only 49 percent of the farmers who irrigated used deep soil sampling for nitrogen, but by 1994 the proportion had increased to 76 percent. In 1989 only 12 percent of the dryland farmers were using deep soil sampling for nitrogen, but by 1994 this increased to 48 percen



Not only has the use of deep soil sampling increased since 1989, but a substantial number of farmers use it every year. Of the farmers not currently conducting deep soil samples on an annual basis 18 percent of the farmers who irrigate and 26 percent of the dryland farmers said they are planning to adopt the practice during the next five years.

The value of deep soil sampling as a nitrogen management practice is the information it provides about the nitrogen in the soil profile that is available for deep rooted plants to use. Higher levels of available nitrogen in the

Figure 1. Deep Soil Sample Farms (percentage).

deeper soil profile permits lower application of commercial fertilizer and, therefore, reduces the nitrogen that may leach into the groundwater.

Deep soil sampling may have been one of the factors that led to changes in nitrogen application rates over time. About 47 percent of the irrigated farmers and 28 percent of the dryland farmers surveyed about their 1994 crop year indicated that they had decreased the amount of nitrogen fertilizer applied per acre during the past five years. In contrast, the 1989 study of farmers found only 16 percent of the irrigated farmers and 10 percent of the dryland farmers said they had decreased nitrogen applications per acre in the previous five years.

The time of application influences the amount of nitrogen that is potentially leached into the groundwater. From an environmental perspective it is desirable to apply nitrogen as close as possible to the point in the growth cycle when the plant needs it. The actual time of application however, is related to practical issues such as the cost of application, tillage practices, and labor and machine availability.

Farmers were asked to indicate when they applied nitrogen by choosing among the following choices: previous fall, preplant, planting, side dress and fertigation (*Figure 2*). The majority of the dryland and irrigated farmers applied nitrogen at only one time. The most popular single application times were either preplant or at planting. More irrigated farmers than dryland farmers used multiple application times. The most popular multiple application combinations were either preplant and planting or planting and side dress for both groups of farmers.

Time Applied	Dryland Farms	Irrigated Farms
Fall Only	11%	5%
Preplant Only	36%	28%
Planting Only	28%	12%
Side Dress Only	7%	7%
Preplant and Plant	8%	19%
Plant and Side Dress	7%	24%
Other	3%	5%

Figure 2. Time of Nitrogen Application

Only 15 percent of the dryland farmers and 32 percent of the irrigated farmers had adopted nitrogen inhibitors for part or all of their farm operations in 1994. When asked about operations on a specific field, only 4 percent of the dryland farmers and 6 percent of the irrigated farmers indicated they were using nitrogen inhibitors on that field.

Other factors also influence the amount of nitrogen applied. Since, the price of nitrogen available for the 1995 crop year was unusually high, a special question on nitrogen application for that crop year was included in the survey. Price impacted the application rates because 32 percent of the dryland farmers

and 34 percent of the irrigated farmers said they reduced the application rate due to the higher prices.

References:

1. Survey data from about 1,800 Nebraska farmers collected in 1995 about the 1994 crop year.
2. S. K. Rockwell, et. al. *Agricultural Producers' Opinions and Production Practices Related to Soil and Water Quality Issues.* UNL Cooperative Extension, May 1992.

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